

REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-26 are presently active in this case. The present Amendment amends Claims 1, 6-7, 9 and 15-16 and adds new Claims 25-26 without introducing any new matter.

The outstanding Office Action objected to Claim 10 under 37 C.F.R. §1.75(a) as failing to distinctly claim the subject matter. Claims 1, 3-10 and 12-24 were rejected under 35 U.S.C. §102(e) as anticipated by Lelong et al. (U.S. Patent No. 5,444,478, herein “Lelong”). Claims 2 and 11 were rejected under 35 U.S.C. §103(a) as unpatentable over Lelong in view of Lee (U.S. Patent No. 6,507,366).

The May 18, 2006 Advisory Action indicated that the Amendment filed on April 28, 2006 after final was entered for purposes of appeal, but upheld the rejections of the final Office Action.

In response to the objection to Claim 10 of the outstanding final Office Action, Claim 10 was amended by the Amendment filed on April 28, 2006 to recite “tangible object” instead of “original image.” In view of the amendment to Claim 10, that has now been entered, it is believed that all pending claims are definite and no further rejection on that basis is anticipated. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work with the Examiner in a joint effort to derive mutually acceptable language.

To clarify the claimed invention, independent Claims 1, 6-7, 9 and 15-16 are amended to recite “the tangible object plane being defined by a spatial orientation of the tangible object.” This feature finds non-limiting support in Applicants’ specification as originally filed, for example at page 31, lines 3-11, page 32, lines 22-24, and in corresponding Figures 12-13.

In light of the amendments to the independent claims, Applicants respectfully traverse the rejection of Claims 1, 3-10 and 12-24 under 35 U.S.C. §102(e), and request reconsideration thereof, as next discussed.

Briefly recapitulating, Claim 1 relates to an image processing method, configured to correct image distortions caused by oblique imaging in which a tangible object on an object plane is taken from different oblique directions to obtain a plurality of partially overlapping images. The image processing method includes: determining a feature point of one of the plurality of partially overlapping images corresponding to a common location of the tangible object, shared by the plurality of partially overlapping images, and determining a matched point of one of the other partially overlapping images corresponding to the feature point *so* that a direction of the tangible object plane is calculated based on the feature point and the matched point, *the tangible object plane being defined by a spatial orientation of the tangible object*; selecting one of the plurality of partially overlapping images as a standard image whose image distortions are to be corrected; and generating a distortion-corrected image *on a projection plane by projecting the standard image onto the projection plane based on the direction of the tangible object plane* such that image distortions in the standard image are eliminated. Independent Claims 6, 7-9, and 15-16 disclose similar features in the context of an image processing method (Claim 6), an image processing apparatus (Claims 7 and 9), and a computer-readable storage medium (Claims 15 and 16).

Turning now to the applied references, Lelong describes a method of processing images to obtain a target virtual image I_o from adjacent source images.¹ Lelong further describes that source images $I_1 - I_n$ are all projected onto an image plane I_o of a virtual camera C_o , so as to obtain the final target image I_o . Lelong's virtual camera C_o orientation

¹ See Lelong in the Abstract.

is defined by angles Φ_0 , θ_0 , ψ_0 ,² and Lelong uses predefined parameters of the virtual camera, since “[t]he parameters Φ_0 , θ_0 , ψ_0 and z_0 of the virtual camera are available in the storage module 210.”³ Lelong also explains that the “virtual camera C_0 is arranged in such a way that its view point is common with or close to the common view point P of the real cameras,”⁴ and also explains that a single landmark point with the coordinates P_x , P_y and P_z is used to define the parameters of the target image plane I_0 .⁵ Accordingly, Lelong fails to teach or suggest that the tangible object plane being defined by a spatial orientation of the tangible object, as recited in Applicants’ amended Claim 1. Lelong’s target image plane I_0 is always orthogonal to an optical axis PZ_0 , that leads through a common point P , from which position all the source images are taken, as one of ordinary skill in the art can see from Lelong’s Figures 1A, 5A and 5B and further explained at column 6, lines 38-39 of Lelong. In Claim 1, however, the direction of the *tangible* object plane is calculated, and the tangible object plane is not bound to the direction of an optical axis of a camera view that leads through a common point P , since “the tangible object plane [is] ... defined by a spatial orientation of the tangible object,” as recited in amended independent Claim 1.

In addition, Lelong fails to teach or suggest the generating of a distortion-corrected image *on a projection plane by projecting the standard image onto the projection plane based on the direction of the tangible object plane*, as further recited in Claim 1. As explained above, since Lelong will project all the images to a virtual plane that is orthogonal to an optical axis that traverses a common view point P ,⁶ Lelong cannot project the standard image onto the projection plane based on the direction of the tangible object plane, since Applicants’ tangible object plane is defined by a spatial orientation of the tangible object.

² See Lelong at column 8, lines 28-39.

³ See Lelong at column 12, lines 19-23.

⁴ See Lelong at column 10, lines 32-40 and in Figure 1A.

⁵ See Lelong at column 18, lines 1-4, and lines 55-58, at column 12, lines 47-66, and in Figures 5A and 5B.

⁶ See Lelong at column 6, lines 31-52.

Applicants further respectfully submit that Lelong fails to teach or suggest all the features of Applicants' dependent Claim 5 and 26, as next discussed.

For instance, regarding dependent Claim 5, Lelong fails to teach or suggest that an image is automatically selected as the standard image based on a calculated direction of the object plane for each of the partially overlapping image. Lelong never calculates an object plane, but merely uses a virtual plane I_o of a virtual camera view C_o .⁷ Accordingly, Applicants also respectfully request reconsideration of Applicants' dependent claims. The outstanding Advisory Action asserts that Lelong teaches such a feature. Applicants respectfully disagree. Lelong clearly explains that the means 210 store the parameters of the virtual camera C_o ,⁸ and that the address computer 200 applies the index j to the real cameras 21.1 to 21. n based on the parameters of the virtual camera C_o .⁹ Applicants believe that Lelong fails to teach or suggest the automatically selecting of the standard image based on a calculated direction of the object plane for each of the partially overlapping image. First, Lelong fails to teach or suggest the calculation of the object plane, as discussed above, and second, the mere fact that the virtual camera C_o parameters are used to choose an image, does not mean that Lelong teaches or suggests that the plurality of partially overlapping image "is automatically selected as the standard image based on a calculated direction of the object plane for each of the partially overlapping image," as recited in dependent Claim 5.

Based on the same rationale as explained above, Lelong also fails to teach or suggest the features of new dependent Claim 26, since Claim 26 recites "one of the plurality of partially overlapping images is automatically selected as the standard based on a smallest inclination angle of a viewing direction of the oblique imaging," and Lelong is silent on a features regarding the smallest inclination angle.

⁷ See Lelong at column 8, lines 28-39, and in Figure 1A.

⁸ See Lelong from column 10, line 67, to column 11, line 4.

⁹ See Lelong at column 11, lines 7-19.

Regarding the reference Lee, relied upon by the outstanding Office Action to form a 35 U.S.C. §103(a) rejection, this reference fails to remedy the deficiencies of Lelong. Lee is concerned with the automatic tracking of a moving object,¹⁰ and does not teach anything regarding the calculation of a direction of the tangible object plane, the tangible object plane being defined by a spatial orientation of the tangible object. Accordingly, even if we assume that the combination of Lelong and Lee is proper, the combination fails to teach or suggest all the features of Applicants' independent Claim 1, and therefore, Applicants respectfully request reconsideration of the rejection under 35 U.S.C. §103(a).

Independent Claims 6, 7-9, and 15-16 recite features analogous to the features recited in independent Claim 1. Moreover, Claims 6, 7-9, and 15-16 have been amended in a manner analogous to the amendment to Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the rejections of Claims 6, 7-9, and 15-16 are also believed to be overcome in view of the arguments regarding independent Claim 1.

To vary the scope of protection recited in the claims, new Claims 25-26 are added. New Claims 25 depends upon Claim 1 and recites "the tangible object is an image on a planar object plane."¹¹ New Claim 26 depends upon Claim 1 and recites "wherein in said selecting, one of the plurality of partially overlapping images is automatically selected as the standard based on a smallest inclination angle of a viewing direction of the oblique imaging."¹² Since the new claims find non-limiting support in the disclosure as originally filed, they are not believed to raise a question of new matter.¹³

¹⁰ See Lee in the Abstract, and in Figure 2A and 2B.

¹¹ Finds non-limiting support in Applicants' disclosure as originally filed, for example from page 4, line 25, to page 5, line 14, and in corresponding Figure 2.

¹² Idem from page 24, line 19, to page 35, line 5.

¹³ See MPEP 2163.06 stating that "information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter."

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-26 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

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